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Natural Language Research

SOME ADJECTIVE CLASSES

derived from

CORRELATIONAL GRAMMAR

Ernst von Glasersfeld

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A B S T R A C T

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Some Adjective Classes Derived from Correlational Grammar (*)

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Georgia Institute for Research
October, 1968

The type of grammar that has come to be known as Correlational Grammar was first thought of by the Italian philosopher and cybernetician Silvio Ceccato. Although his basic ideas concerning the human use and the structure of language were originally (1930-1946) by-products of an ambitious - and not yet concluded - effort to analyse and operationally define the 'intelligent' activities of the human mind, they have since been applied to empirical language research (from 1947 on) and - as a hopeful approach - to eminently practical problems such as Information Storage and Retrieval (1,2,3), Machine Translation (4,5), and Automatic Parsing or Sentence Analysis (6,7,8).

It was in the course of these applications that correlational grammar (CG) was developed and refined as a tool for the handling of linguistically communicated information. Its purpose was and is the interpretation of sentences as they are found in texts, and not the generation of sentences; nor does CG as such set out to be 'descriptive'; but, as we shall try to demonstrate by means of a very restricted example, CG implicitly contains the elements needed to establish a classification of words that would go considerably further into the realm of semantics than do the traditional ones and would therefore, be useful both in language analysis and in teaching.

Having been developed for the analysis of written text, CG disregards phonological characteristics. Since its purpose was not description, it also disregards morphology and focuses

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exclusively on the syntactic possibilities of words and word combinations as individual items. Projected on a given vocabulary, CG does not lead to a division into word-classes, but merely to the characterisation of the words in terms of their individual capacity for entering into specific syntactic relations with other items.

The CG of present-day English which we have been developing contains a master table (still open-ended, because not all areas of English syntax have as yet been analysed to the same extent) of syntactic relations, called Correlations, which are represented as ternary structures consisting of two correlated items, or Correlata (one left-hand item and one right-hand item), and the Correlator responsible for the combination. The correlational possibilities of words are recorded by means of Correlation Indices (Ic's), which indicate the word's capacity to function either as left-hand or as right-hand item in the correlation represented by the particular index.

(e.g. The string "I do" represents the correlation 2210N; the word "I" in the vocabulary, therefore, bears the Ic 2210N-1, where the final digit indicates that the word can function as left-hand item in that correlation; the word "do" bears the Ic 2210N-2, indicating that word's possible function as right-hand item in the same correlation. The inverted form "do I" represents correlation 2210M, which has its own Ic's.)

Since CG necessarily contains a group of correlations which reflect the relation found between an 'actor' and the activity he performs (equivalent, in this respect, to the subject-verb function of traditional grammar), the class of nouns and nominal phrases that can function as subjects of verbs is extensionally defined in the system; i.e. all subject-candidates bear at least one left-hand index of an actor-activity correlation. Subject-nouns bear such Ic's by a priori assignation in the system's vocabulary, nominal phrases receive it in the course of

the analysis procedure by an intricate subroutine which we call 'Reclassification' (7).

To discriminate correlations, i.e. to isolate them as prototypes expressive of particular relations, we rely on the native speaker's intuition and, where this is uncertain or inconclusive, on translation into another language.

To describe a particular correlation we use loosely 'transformational' paraphrases or, where this is not satisfactory, an ad hoc description of the relation.

Once a given vocabulary has been fully indexed with Ic's which reflect the individual items' correlability, every Ic or group of Ic's, by its extension in this vocabulary, determines a word-class. Some of these classes coincide more or less with those of traditional grammar; others reflect combinatorial characteristics which, hitherto, have not been considered as criteria for the formation of word-classes. A classification of adjectives, tentatively derived from the assignation of Ic's relevant in a problem area that has been spotted by many linguists (10,11,12,13, 14) may serve as an example of this not yet exploited possibility of CG.

We took the adjectives contained in the vocabulary of our parser and, to get a somewhat more representative collection, supplemented with adjectives showing a frequency rank number above 49 in Present-Day American English (9). Examining these adjectives then as to their possible occurrence in any of the ten constructions which CG distinguishes for the string

nominal + to be + adjective + infinitive

we can list the candidates for each construction.

A: "John is easy to please"

Paraphrase: to please John is easy.

The subject of the sentence is the object of the infinitive activity; the adj. concerns the activity + the object; the infinitive cannot have a direct object.

Note 1: if a continuous form of "to be" is used, the construction switches to type I (John is being easy in order to please).

Note 2: not all the adj. in this list form construction A when they are modified by "too" or "enough"; some of them definitely turn the construction into type G (e.g. this film is too interesting to miss), others create an ambiguity of A and G which we cannot resolve (e.g. the problem is too difficult to solve).

List A	e.g.
bitter 2 (= painful)	His assassination was b. to accept.
(un)comfortable	The hotel was c. to reach.
difficult	That car is d. to handle.
easy	John is easy to beat.
great 2 (= splendid)	The game was g. to watch.
hard 2 (= difficult)	This score is h. to better.
impossible	The mountain was i. to climb.
(un)interesting	He may be i. to talk to.
lovely 2 (= delightful)	That road is l. to drive.
nice	She is n. to be with.
quick	The job was q. to do.
simple 1 (= uncomplicated)	This question is s. to answer.
(un)safe	That path is s. to walk.
slow	Hepatitis is s. to cure.

B: "John is eager to please"

Paraphrase: we know of no satisfactory paraphrase. Katz and Postal (10) distinguish this construction from type A by the fact that it contains the underlying P-marker 'John pleases someone'; but this is not satisfactory for our purpose, since this P-marker can be found also in constructions C, D, E, F, H, and I.

The subject is the actor of the infinitive activity; the adj. specifies the subject's attitude towards the activity and the activity is merely envisaged; the infinitive can have a direct object.

Note 3: a continuous form of "to be" is unlikely with these adj. because they, in themselves, express a more or less continuous state; if it does occur, the construction switches to type I (John is being eager in order to please).

Note 4: modification of the adj. by "too" or "enough" does not change the construction.

List B

(un)able
anxious
careful 2 (= anxious)*
(decided)
desirous.
(disposed)
(determined)
eager
(un)fit 1 (= suitable)
mad 2 (= eager)**
prepared 1 (= willing)
reluctant
wild 2 (= eager)
(un)willing

* "careless" does not function in this construction because it has no meaning that corresponds to "careful 2".

** The specific ambiguity of "mad" creates an inevitable duality of interpretation in sentences such as "he was mad to come": if we read "mad" as meaning eager, we get construction B; if we read it as meaning deranged, we get construction E (it was mad of him to come).

(Some past participles, between brackets, were included as a sample of their adjectival behaviour, which, in this construction, supersedes the passive interpretation; note that "prepared", in this sense, does not function as past participle since it cannot take a "by"-complement.)

C: "John was slow to understand"

Paraphrase: John was slow ABOUT understanding.

The subject is the actor of the infinitive activity; the adj. specifies an aspect of the subjet's performance; the infinitive can have a direct object.

Note 1 applies;

Note 5: if the adj. is modified by "too" or "enough", the construction switches to type F (John was too slow to be able to understand).

List C

quick
slow

D: "John is likely to go away"

Paraphrase: THAT John goes away is likely.

The subject is the actor of the infinitive activity; the adj. concerns merely the occurrence or non-occurrence of the event; the infinitive can have a direct object.

List D

certain 1 (= without fail)
(expected)
((un)known)
(un)likely
(said)
sure 1 (= without fail)

Note that "uncertain", "unexpected", "unsure" cannot be used in this construction.

E: "John is clever to go away"

Paraphrase: to go away is clever OF John.

The subject is the actor of the infinitive activity; the adj. expresses an assessment of the subject + act.; the infinitive can have a direct object.

Note 1 applies, but some of the adjectives in this list allow an interpretation of the sentence as type I without the continuous form of "to be" (e.g. John was frank to make an understanding easier - which is unambiguous and would seem to be recognisable by a check of semantic relations linking actor, adj., and activity - and John was nice to get it over quickly - which seems to be unresolvably ambiguous).

Note 5 applies.

List E

bright 2 (= clever)
brilliant 2 (= clever)
careless
civil 2 (= polite)
clever
(in)correct
evil
(un)fair (2)
frank
fresh 2 (= cheeky)
good 3 (= moral)
gross
irresponsible
(un)just
(un)kind
mad 1 (= deranged)
mean 2 (= unkind)
nice
(un)reasonable
right 1 (= correct)
simple 2 (= naive)
stupid
sweet 2 (= kind)
wrong

F: "John is young to go to school"

Paraphrase: John is young FOR going to school.

The subject is the actor of the infinitive activity; the adj. specifies a relative inadequacy (or adequacy) of the subject; the infinitive can have a direct object.

Note 1 applies;

Note 4 applies;

Note 7: modified by "too", "enough", "a bit", etc., almost any adj. fits this construction; we have no criterion for distinguishing the adjectives that fit without modification from those that require it, and the list we give is, therefore, bound to be idiosyncratic.

List F	e.g.
big	He was b. to be so childish.
dark 2 (colouring)	Jane is d. to play a Swede.
early	We were early to arrive.
fair 3 (= blond)	He is f. to be a Sicilian.
heavy	John is H. to ride a pony.
large	The wound was l. to heal in one week.
late	We are l. to get to town.
light 1 (weight)	The bomb was l. to cause all that damage.
old	John is o. to enter that race.
small	She is s. to talk so much.
young	He is young to be President.

G: "John is heavy to lift"

Paraphrase: John is heavy WITH REGARD TO being lifted,
or, when it comes to lifting him, John is h.

The subject is the object of the infinitive activity; the adj. concerns the object; the infinitive cannot have a direct object. Note that the paraphrase given for type A is, here, impossible or changes the lexical meaning of the adj. (e.g. "mushrooms are good to eat" - good 1, = =pleasing - does not mean "to eat mushrooms is good", where "good" is good 2, = beneficial).

Note 1 applies;

Note 7 applies.

List G	e.g.
bad	That paper is b. to draw on.
bitter 1 (taste)	The stalks are b. to eat.
beautiful	The house was b. to look at.
cheap 1 (= inexpensive)	A bicycle is c. to use.
clean	The handle was c. to touch.
cold 1 (temp.)	The icicle was c. to hold.
cool 1 (temp.)	The air was c. to breathe.
dark 1 (= not lit)	The street was d. to cross.
different	Their twins are d. to look at.
economical	The garage was e. to build.
excellent	Their eggs are e. to eat.
expensive	My car is e. to run.

(List G, continued)

fair 1 (= handsome)	The queen was f. to behold.
far	The target was far to hit.
firm 1 (= solid)	The rock was f. to stand on.
good 1 (= pleasing)	Mushrooms are g. to eat.
heavy	The gadget is h. to carry.
hot 1 (temp.)	The stove was h. to touch.
large	That pill is l. to swallow.
light 1 (weight)	This suit is l. to wear.
lovely 1 (= handsome)	The girl was l. to look at.
old	That blade is o. to use for another week.
perfect	The picture was p. to put over the mantlepiece.
(im)practical	This cupboard is p. to open.
pretty	Cardinals are p. to watch.
small	The fish was s. to keep.
warm	The lake is w. to bathe in.
wet	The meadow was w. to cross.
young	He is y.to employ in a responsible job.

H: "John is sad to go away"

Paraphrase: to go away CAUSES John to be sad.

The subject is the actor of the infinitive activity; the adj. specifies a reaction of the subject; the infinitive can have a direct object.

Note 1 applies;

Note 5 applies.

List H

afraid	proud
content	sad
glad	satisfied
(un)happy	sorry

I: "John was critical to upset the speaker"

Paraphrase: John was critical IN ORDER TO upset the speaker.

The subject is the actor of the infinitive activity; the adj. specifies a deliberate attitude of the subject; a direct object of the infinitive is (almost?) indispens-

able. Sentences that can be interpreted in this way can often be interpreted as type E as well (e.g. "the dog was clever to get a biscuit" may mean that the dog was clever in order to get a biscuit, or that it was clever of him to get it); the ambiguity is always difficult and often impossible to resolve even by examination of the wider context.

Note 4 applies;

Note 8: the adjectives that can occur in this construction are very numerous; many could be excluded if one were dealing with scientific texts only; but since very many may occur in writing of colloquial style, we here merely indicate those lists which we believe to be absolutely excluded.

Lists B (cf. Note 3) and D are excluded;

Lists A, C, H, are excluded if the auxiliary is not in the continuous form.

J: "It is sad to go away"

Paraphrase: to go away is sad.

The nominalised infinitive is the subject of the sentence; the "it" functions as 'subject marker'; the adj. concerns the nominalised infinitive; the infinitive can have a direct object.

Note that in sentences such as "it is early to go away", the "it" is not a subject marker (paraphrase type J is not possible) but has a specific pronominal function which we call 'ambiental' because the pronoun stands for an aspect of temporal or meteorological ambience; this last example, therefore, is of construction G (it is early with regard to going away, or, it is early for the purpose of going away).

Lists B (except past participles), D, F, are absolutely excluded.

List J

beautiful
bitter 2
bright 2
brilliant 2
careless
cheap 1,2
(un)civil
clever
(un)comfortable
complicated
(in)correct
dear 2
different
difficult
easy
economical
evil
(in)expensive
far
(un)fair (2)
frank
fresh 2
good 1,2,3
great 2
gross
hard 2
impossible
(un)interesting
irresponsible
(un)just
(un)kind
lovely 2
mad 1
mean 1,2
nice
(im)practical
quick
(un)reasonable
right 1
sad
(un)safe
simple 1,2
slow
splendid
stupid
sweet 2
wrong

An investigation of this kind, carried out by two or three speakers of a language (*), cannot possibly be considered definitive. It inevitably contains idiosyncratic omissions and inclusions. An analytical examination of a large corpus of contemporary texts would certainly help to clean up these tentative lists; but that is by no means all that remains to be done.

Having isolated ten types of <u>nominal + to be + adjective + infinitive</u> string and having sorted the adjectives of a limited collection on the basis of their possible occurrence in the individual types of string, we find that the degree of certainty with which we can determine the type of construction from the adjective occurring in the string varies a great deal. The adjectives of List B, for instance, when inserted in the above string, unequivocally determine the string as type B, provided there is no continuous form of "to be".

With the adjectives of the other lists this is not so; most of them can occur in two, some in three different constructions. This means that, if the adjective found in the string is not one of List B, we cannot be certain - at least by looking at the adjective alone - which type of construction the sentence has. However, the classification of adjectives does reduce the possibilities of interpretation; and this is a step forward from having merely one generic class of adjectives and ten types of construction into which, theoretically, every one of them can fit: it is obviously easier to devise semantic criteria of disambiguation when the syntactically possible interpretations have been reduced from ten to two or three.

Moreover, we are fairly sure that semantic analysis of the adjectives belonging to one and the same list can (for

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* We gratefully acknowledge the suggestions and corrections Dr. Brian Dutton supplied during the preparation of this paper.

some of the lists at least) bring to light a common semantic element that could serve in the intensional definition of the particular adjective class. This is certainly so for List B, where the common element is that the adjectives express an attitude towards an envisaged activity; it is so for List D, where the adjectives express an assessment of probability; and it is so for List E, where the adjectives express a judgement based on the actor's activity; and for List H, where the adjectives express the kind of state of which only sentient subjects are capable.

What we have presented here, thus, should be considered as little more than the suggestion of a method and, perhaps, a tool for further investigation.

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13. ABSTRACT

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